ASSESSING THE CENTRAL ISSUES IN THE DEBATE SURROUNDING THE ADEQUACY OF OCCUPATIONAL PENSION PLANS

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ASSESSING THE CENTRAL ISSUES IN THE DEBATE SURROUNDING THE ADEQUACY OF OCCUPATIONAL PENSION PLANS

by

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Part I Overview and Critical Assessment of the Central Issues

Part II Valuation Assumptions and the Costing of Occupational Pension Plans in an Inflationary Climate.

"The views presented in this paper are those of the author and do not necessarily reflect the views of or positions of the Department of CCAC
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Executive Summary

The paper is divided into two parts. In the first, the perceived limitations of private pension plans are reviewed, and possible policy initiatives designed to redress these limitations are critically reviewed. In the second, the valuation assumptions used to cost private pension plans in today's inflationary climate are reviewed and their implications noted. The cost implications, as measured by changes in required contribution rates, of possible initiatives to improve the cost-of-living protection provided by private pension plans are assessed.

The issues regarding private pension plans reviewed in the first section of the study are: vesting, cost-of-living protection (post retirement), cost-of-living (pre-retirement), portability, surviving spouse's benefits, funding and the security of benefits, and coverage. Highlights of the policy recommendations are as follows:

> "Pension benefit formulas must be costed against the benchmark of a non-inflationary environment if both employers and plan members are to correctly perceive the true cost of the benefit if it is - at least in principle - to be preserved in real terms in both the accrual and the retirement period.
>
> Performance indexing, in which inflation-augmented investment earnings above (say) 3% are applied to escalating benefits in pay, is likely to provide adequate cost-of-living protection in all but the most adverse circumstances.
>
> The move toward earlier, if not immediate, vesting appears to be inevitable. This move should logically be accompanied by the requirement that the capital sum necessary to purchase the deferred annuity be transferred to a "locked-in" RRSP. Further, if the real value of the defined benefit is to be preserved, the capital sum should be determined using a real interest rate of (say) 3%.
>
> The introduction of a mandatory benefit for the surviving spouse would improve the retirement income provided elderly women in particular. To prevent the arbitrary redistribution of wealth (for example, from single to married employees), the defined benefit should be actuarially reduced for the married employee at the time of retirement."

The main theme developed in the second part of the study is that most occupational pension plans are being costed on the basis of valuation assumptions which exceed the real rate of interest. The implication is that the contribution rates so established can be realized only if the real value of pension benefits is eroded by inflation which occurs during the employee's retirement and - in most cases - in his active work years as well.

The required increases in contribution rates when post-retirement or pre- and post-retirement price indexing is introduced are illustrated for simplified final earnings, career average and flat benefit plans. The increases are calculated by replacing reported valuation assumptions by hypothetical real interest rates of 2% and 3%. The increases are particularly large for flat benefit and career average plans when pre- and post-retirement indexing is introduced, as the erosion of the real value of accruing benefits which would occur in the absence or periodic plan amendments is halted.

If mandatory indexing - whether contractual or performance - were introduced, each sponsor would value the benefits payable under the terms of his plan on the basis of the real interest rate embodied in the indexing initiative. The difference between the reported valuation assumption and the real interest rate would determine, given the benefit formula, the required increase in the contribution rate. The large variation in reported interest rate assumptions suggests there would be substantial variation across plans in these required increases.

If mandatory indexing of post-retirement benefits is introduced, then workers must either (i) allocate a larger fraction of their lifetime earnings to pension benefits and/or (ii) accept a "scaling down" of present benefit formulas. The possibility of (ii), and perhaps actuarial guidelines to facilitate it, should be acknowledged by those advocating pension reform.

Mandatory indexing of post-retirement benefits, if introduced, should apply only to future service. To extend mandatory indexing to past service credits would arbitrarily redistribute wealth from employers/shareholders to employees who have past service under the terms of the plan. Policy-makers might encourage plan sponsors to offer an actuarially based "scaling down" of past service credits in return for a retroactive extension of the indexing initiative. Employees could then choose whether or not to extend indexing to their prior service under the revised terms of the plan.

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1. INTRODUCTION

Objectives and Issues

The objectives of public policy toward the provision of retirement incomes are twofold: reducing the incidence of poverty among the aged, and facilitating the replacement of income for those Canadians who cease active work and enter their retirement years. The existence of OAS/GIS and various provincial "top-offs", together with the modest replacement rate and earnings ceiling of the C/QPP (25% of the average industrial wage), combine to make Canada's public pension look fairly generous - by international standards - at low income but not at high income levels. This fact has helped to focus attention on the income replacement objectives of public policy, and hence to the perceived limitations of employer-sponsored (occupational) pension plans in the private sector. The purpose of the first part of this report is to provide an objective assessment not only of these perceived limitations, but also of the policy initiatives that might be directed toward them.

The major catalyst to the present debate regarding the reform of private pension plans is undoubtedly inflation. The indexing of pensions in pay in the private sector is rare and, in today's inflationary climate, this limitation is perhaps the major concern of those advocating pension reform. Inflation may also reduce the real value of pension benefits even as they accrue during the plan member's active work years, at least in (unamended) flat benefit and career average plans. For the mobile employee, the present situation is further aggravated by inflation. Those employees who are entitled to deferred pensions face the prospect of having their pensions eroded in real terms by inflation which occurs in both the pre- and post-retirement period. From a different perspective, plan sponsors can discharge their obligations to terminating, vested employees at high interest rates which contain a substantial inflation premium. This result, in turn, threatens to make illusory any move toward earlier or immediate vesting. Further, as discussed later in the report, inflation and the subsequent (and retroactive) amendments to mitigate its impact contribute to the present underfunding of flat benefit plans. The threat to the security of the benefits so provided, in the event of plant shutdowns, firm insolvency or other events which may lead to the termination of plan, is becoming increasingly topical.

There are two broad options under active consideration by those concerned with pension reform. The first is to pre-empt the need for legislated improvements to occupational plans by

expanding the C/QPP so that the income replacement objective of public policy is achieved through the earnings - related public pension program. The second is to address these limitations, to "shore up" the private system so as to improve its delivery of retirement incomes in an inflationary climate. The emphasis in this report is on the second option, since (1) policy initiatives regarding occupational plans are likely even if the C/QPP were to be expanded and (2) the expansion of the C/QPP does not appear likely at the present time. A major theme of the report is the importance of costing the pension benefit formula against the benchmark of a non-flationary environment so that both the employer and plan members correctly perceive the true cost of the benefit if it is - at least in principle - to be preserved in real terms in both the accrual and the retirement period. This exercise, in turn, provides insight into the type of initiative necessary to improve the delivery of retirement incomes to mobile employees and to improve the security of benefits in underfunded flat benefit plans.

Relevance of the Economist's "Rational Man"

Those concerned with pension reform tend to take as given and as unquestioned the need to improve through public initiative the delivery of retirement incomes by occupational pension plans. If rational workers have complete information regarding the valuation of pension benefits, and if labour markets are competitive, then existing pension arrangements - no matter how flawed they may appear to those who advocate reform - must be efficient. The disparity in these viewpoints merits elaboration.

Consider, for example, the proposal that vesting (the time at which an employee becomes legally entitled to a benefit under the terms of the plan) be made full and immediate. The proposal is motivated by the fact that, at present, the mobile employee may forfeit his "deferred wages" if he fails to meet the age and/or service requirement of existing vesting rules. In the "rational man" paradigm of mainstream economic analysis, delayed vesting is regarded as but one dimension of the employment contract which represents the efficient solution to a market problem. If delayed vesting is outlawed, then employers would be forced to adopt alternative devices to reduce labour turnover and to retain skilled workers. Steeper wage grids with respect to years of service, for example, could serve this purpose and thus impose analogous costs on the mobile worker. Further, deferred vesting may be an efficient means by which the employer assumes the initial cost of upgrading the general (or transferrable) skills of the worker. In its absence, the worker may be forced

to assume these costs in the form of lower starting wages, and the net result might be a reduction in investment in human capital.

Those concerned with pension reform reject, usually implicitly, the "rational man" paradigm. In the context of the vesting debate, workers may be assumed either unwilling or unable to assess the cost of forfeited pension benefits. Even if employees are assumed capable of assessing these costs, policy-makers might argue that workers should be required to earmark a portion of their lifetime earnings to provide for their consumption needs during retirement.[1] Policy-makers may also draw attention to the fact that delayed vesting can result in the loss of pension benefits for workers who are involuntarily terminated through plant shutdowns, firm insolvency and so forth. This argument would be nullified, however, if steeper wage grids with respect to years of service were used by employers to reduce labour turnover in the event that delayed vesting provisions were outlawed.

As emphasized in the second portion of this report, employee valuation of pension claims is a complicated issue. There are many who would argue - on this basis alone - that the "rational man" paradigm is severely compromised. Many young employees, for example, belong voluntarily to contributory, defined benefit plans in which the value of their own contributions is more than sufficient to purchase their accruing benefits. Many employers have erroneously argued that the Canadian economy "cannot afford" indexed pensions, a result which may have slowed the search for options which would provide improved cost-of-living protection. There is a reasonably persuasive argument that many employers and their workers have not understood how pension plans must be costed if the contribution rates so determined are to be sufficient - at least in principle - to provide indexed benefits.

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1. In the discussion of the income-replacement objectives of the C/QPP, the Task Force notes (Summary, page 27): "the assumption is made here that a large proportion of Canadians would, if given the choice, choose to arrange their lifetime consumption so that they would be roughly as well off after retirement as they were before". The crucial phrase "if given the choice" suggests that in the absence of a forced savings scheme such as the C/QPP, Canadians would not be able to allocate their lifetime incomes so as to achieve the desired degree of consumption stabilization.

Even if rejected, the "rational man" paradigm focuses attention on the need for policy-makers to justify the basis for their proposed initiatives. If action is contemplated on the assumption of incomplete information on the part of workers regarding the value of their pension benefits, then the possibility of improving the flow of such information merits attention. If action is contemplated on the assumption that workers have complete information, then the outright paternalism - and the likelihood that individuals' preferences are deliberately being overridden - merits note. Finally, and perhaps most importantly, the "rational man" paradigm can help identify the economic adjustments likely to accompany a policy initiative, which may be a pivotal factor in the decision as to whether the contemplated initiative ought to be implemented.

Criteria to Assess Policy Initiatives

Subject to the qualifications noted above, the consensus view is that policy initiatives designed to improve the delivery of retirement incomes by occupational pension plans are required. The preceding discussion suggests that three criteria be applied to any proposed policy initiative. First, it must improve the ability of occupational plans to deliver retirement incomes *per se*. Second - in the absence of explicit objectives to the contrary - it should be designed to have minimal income redistributive effects. The creation of windfall gains or losses is to be avoided. Third, its impact on the efficiency of private contracts should be minimized. As an implication, this final criterion recognizes the likelihood of an endogenous response by market forces to policy initiatives.

The Previous Studies

Major studies of the retirement income system in Canada have recently been completed by the Federal Government's Task Force on Retirement Income Policy (Task Force), the Economic Council of Canada (Council), and the Special Senate Committee on Retirement Age Policies (Senate Committee): The report of the Royal Commission on the Status of Pensions in Ontario is due shortly.

The Task Force's study provides a detailed analysis of the limitations of occupational pension plans, especially those in the private sector, and surveys the issues involved in the possible expansion of the C/QPP. The Task Force makes no specific recommendations, but sets out four basic options for the reform of earnings-related plans. These are: (1) strengthen occupational plans by a set of mandated reforms; (2) encourage

the gradual elimination of defined benefit plans and their replacement by defined contribution plans; (3) mandate occupational plans subject to minimum benefit requirements; and (4) enlarge the C/QPP with or without provisions whereby employers offering comparable benefits might "contract out" of the enlarged segment. The theme of the Task Force's analysis is that reform of the retirement income system is urgent and that attention must now focus on alternative reform initiatives.

The Council pays particular attention to the impact of demographic developments on the contribution rates necessary to meet the obligations due under C/QPP and OAS/GIS together with the impact of these public programs on aggregate saving and capital formation. Limitations of occupational plans, particularly in an inflationary setting, are noted. The policy recommendations, which are somewhat divorced from the main body of analysis, favour the improvement of occupational plans rather than the expansion of the C/QPP as means of achieving retirement goals with respect to income replacement.

Although charged with the initial task of examining the existing policies that affect retirement age, the Senate Committee found it necessary to address the more general issue of the adequacy of retirement incomes. The Committee argues that the most difficult problems faced by occupational plans are those posed by inflation and - perhaps prematurely - concludes: "The possibility of improving and extending the private pension plan system in an inflationary climate seems remote". Noting that the C/QPP preserves the real value of pension credits in both the pre- and post-retirement periods, and that coverage under the C/QPP is virtually complete, the Committee recommends that both the benefits and contribution rates to these plans be sharply increased. Although the Senate Committee conducted little original research, its policy prescriptions are representative of those who argue that an enlarged role for the government is necessary to improve the delivery of retirement incomes.

2. LIMITATIONS OF OCCUPATIONAL PLANS IN THE PRIVATE SECTOR

Vesting

At present, most provincial Pension Benefits Acts require that an employee's benefits must vest after he has reached age 45 and completed 10 years of service. If an employee leaves a plan before his benefits vest, then he typically receives only the return of his own contributions, usually with interest. In a non-contributory plan, he receives nothing. Many plans have more liberal vesting provisions that the statutory "45 and 10"

rule.[2] Nonetheless, about 75% of members of occupational plans are in plans which require at least 10 years of service before their benefits vest. As a result, mobile employees may enter retirement with few - if any - years of pensionable service, and thus draw minimal - if any - income from occupational pension plans.

The nearly universal recommendation is that minimum vesting provisions be relaxed. Saskatchewan, for example, has recently proposed an amendment to the Pension Benefits Act which would require (at a minimum) that an employee's benefits vest when his age plus years of service equal 45. As noted in the introduction, the move toward earlier or immediate vesting will probably lead employers to adopt alternative incentives - such as wage grids which are more steeply graded with respect to years of service - to reduce turnover and to retain skilled employees. On balance, and in part due to the discontinuity of present vesting rules (i.e. an employee has 100% vesting or none at all), the recommendation that minimum vesting rules be relaxed appears to be sound. The issue, in principle, becomes that of weighing the administrative costs of (say) immediate versus slightly delayed vesting against the advantage of the former in enhancing the delivery of retirement incomes. The logic of introducing a more relaxed vesting standard - to improve the delivery of retirement incomes per se - suggests that the vested benefits of the terminating worker be "locked in". The worker should not have the option of receiving the cash equivalent of the benefit due him under the terms of the plan.

A major issue regarding the reform of statutory vesting rules is the extent to which the benefits so conferred, in the absence of complementary initiatives, might be illusory. The advantage of immediate vesting for the young employee in a contributory, defined benefit plan is likely - in the absence of such parallel initiatives - to be negligible. The contributions made by the young employee are likely to be sufficient to purchase all of the accruing benefits to which he becomes entitled. This result is due to the fact that the employer's liability in a contributory, defined benefit plan is limited to the difference between the accumulated value of the worker's own contributions and the capital sum necessary to purchase the deferred annuity promised under the terms of the plan.

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2. Details of vesting provisions in force in Canada, together with an international perspective which shows that minimum vesting provisions in Canada involve more delay than in most countries, are presented by the Task Force.

Particularly when nominal or market interest rates are high, this capital sum is likely to be low and hence the employer's liability is likely to be small or non-existent. The awkwardness of this situation is evident in the rather complicated scheme that accompanies Saskatchewan's proposed move toward earlier vesting. The proposed legislation stipulate that the worker's own contributions may be applied to purchase not more than one-half of the capital sum necessary to acquire the deferred annuity. If his contributions can purchase more than 50% of the benefit, than the excess may be transferred by him to a (perhaps "locked-in") RRSP. Without this additional requirement, the proposed move to vesting when the employee's age plus years of service equals 45 would confer little or no benefit to young employees in contributory, defined benefit plans. In passing, it should be noted (Statistics Canada, Pension Plans in Canada 1978) that 99% of members of occupational pension plans in the public sector are in contributory plans. The corresponding figure for the private sector is 50%. Further, the vast majority - 93.6% in 1978 - of members of occupational plans are in defined benefit plans.

In short, the move to more rapid and immediate vesting is likely to confer little or no gains to young employees (except those in defined contribution plans) without complementary legislation akin to that proposed by Saskatchewan. An attractive option that merits consideration is the requirement that the deferred annuity to which the terminated employee becomes entitled be valued on the basis of a real interest rate. This requirement would establish a fund which - at least in principle - would be sufficient to preserve the real value of the deferred annuity, both pre- and post-retirement. In so doing, it would also be a major step toward improving the effective portability of pension benefits. The use of a real interest rate to value the deferred annuity due terminated employees, and presumably current annuities as well, would raise plan costs and thus increase required contribution rates. This aspect of the adjunct reform receives careful attention in the second half of this study.

Cost-of-Living Protection: Post-Retirement

The full and contractual indexing of pensions in force is very rare in the private sector. This fact implies that the real value of such benefits is likely to be eroded - perhaps severely - by inflation which occurs during the plan member's retirement years. This fact also draws attention to the rather sharp contrast between occupational plans in the public sector, where indexing is prevalent, and those in the private sector. Plan sponsors in the private sector have frequently made cost-of-living

adjustments to offset in part the impact of inflation. There is little reason, however, to challenge the Task Force's conclusion that such adjustments have on average offset less than one-half of the erosion in the real value of pensions in pay caused by inflation.

There is an emerging consensus that this major limitation of occupational plans in the private sector, the lack of a formalized means of providing cost-of-living protection for pensions in pay, must be rectified. The attitude of the business community and interested professional groups, although not yet unanimous, has become dramatically more sympathetic to this need during the past five years. The crucial issue now faced by plan sponsors and policy-makers alike is how to transform the macroeconomic truth that indexed pensions only preserve pensioners' claims on real output into a practical scheme whereby individual plans can provide improved cost-of-living protection. Two basic approaches to preserving the real value of pensions in pay are receiving the most attention.[3] The first is to exploit the federal government's ability to underwrite inflation risk by having the government issue index bonds, sell price-indexed annuities, "stabilize" real returns or provide inflation insurance - in order to enable plan sponsors to provide full and contractual indexing. The second is to require plan sponsors to apply "excess" investment earnings above a statutory real interest rate to escalating pensions in pay, a technique known as performance indexing. The advantage of performance indexing is that no further government involvement is required; the disadvantage, that full offset of the impact of inflation is not guaranteed.

The crucial question is the extent to which performance indexing is likely in practice to approximate full cost-of-living protection. The simulations performed by the Task Force (see, especially, Table IX-2, Volume I) illustrate the likely success of performance indexing. On the assumption that the plan's assets are fully invested in 90-day commercial paper which produces a real return of 2%, the data indicate that the use of "excess" earnings (in this case, in excess of 2%) would have been sufficient to offset virtually all of the impact of inflation during the period 1962-1978. Using a 2% return with the plan's assets fully invested in long-term bonds, the real value of the

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3. Both schemes, including possible variants, are discussed in detail by the Task Force on pages 225-237 of its Report. The Council discusses an inflation insurance scheme and related issues on page 83-84.

pension in 1978, 16 years after its commencement - would have been 83% of its original value. If the pension had not been indexed, its real value would have fallen to 43% of its initial value. Significantly, these simulation results were obtained for a period of almost secularly rising inflation. Since the real returns provided by fixed-income investments are likely to be low in such periods, the simulation results indicate the probable success of performance indexing even under the most adverse of circumstances.

A conservative estimate of the real return on a diversified portfolio of fixed-income securities would be 2% to 3%. Historical data suggest that a figure of 3% to 4% would be appropriate if equities were included in the plan's portfolio. These figures suggest that a real return assumption at 3% - or at most 4% - would be appropriate if a performance indexing scheme were introduced with the explicit goal of approximating full cost-of-living protection.

There are, however, a large number of unanswered questions regarding the mechanics of a performance indexing scheme. These include: the use of a "benchmark" as opposed to the plan sponsor's own portfolio to define "excess" investment earnings; the choice of the real interest rate; the use of the total income from the portfolio or just that from the fixed-income portion to define excess earnings; and the mechanism by which surpluses (if excess earnings exceed the amount necessary to fully offset the impact of inflation) - and perhaps deficits (if the actual investment earnings are in fact less than the real interest rate) - are to be "banked" for the future. Three criteria are relevant to the ultimate design. First, the scheme must be designed so as to provide on an a priori basis a high degree of inflation protection. Second, the incentive for the plan sponsor to achieve a favourable investment return must remain as intact as possible. Third, any distorting or disruptive impact on the capital market emanating from revised investment incentives to sponsors, which could alter portfolio composition objectives, should be minimized. In general, the analysis of performance indexing mirrors that of many of the policy initiatives proposed by the Task Force, the Council and other groups. The concept has received considerable attention, but the practical issues surrounding its implementation have not. The most important issue, the impact on plan costs (and thus benefit design) of mandating either contractual or performance indexing, continues to receive too little attention. An attempt to rectify this situation is contained in the second part of this report.

Finally, the fact that performance indexing may just restructure the stream of pension payments - without altering

their present value - merits note. This would be the case, for example, if the introduction of mandatory indexing were accompanied by a scaling down of the basic pension benefit. Employees would have "low start, escalating" pensions rather than "high start, non-escalating" pensions. Since this option is one which they presumably have today, but - on the whole - have not elected to exercise, the question arises as to why the present pattern is implicitly preferred. Individuals' attitudes towards mortality risk and its ramifications, together with possible adverse tax consequences of an escalating versus non-escalating payments, merit investigation.

Cost-of-Living Protection: Pre-Retirement

There are two adjustments for inflation which are required if the real value of pension benefits is to be preserved in the pre-retirement period. The first pertains to the earnings base. It is widely recognized that a final earnings plan - because of the tendency of wages to rise in line with inflation - succeeds in preserving the real value of an employee's pension credits as they accrue during his active work years. The second pertains to the updating of deferred pensions in order to prevent their erosion in real terms by inflation which occurs prior to the employee's retirement. The issue of updating deferred pensions is an integral part of the problem posed for the mobile employee under present arrangements, and its discussion is appropriately postponed to the discussion of the portability of pension credits.

Data compiled by Statistics Canada (Pension Plans in Canada, 1978) indicate that final earnings plans are both far from universal and still concentrated in the public sector. In 1978, 95.3 percent of members in public sector plans were in plans of the final earnings variety, compared to 29.8 percent of members in private sector plans. Career average and flat benefit plans thus constitute the majority, by membership, of defined benefit plans in the private sector.

In fact, the likely erosion of the real value of benefits during the pre-retirement period is not so great as the raw statistics on the incidence of final earnings versus career average and flat benefit plans might at first suggest. In flat benefit plans, which are typically renegotiated in formal collective bargaining, the mean benefit rate - the monthly pension for each year of credited service - rose from $4.28 in

1970 to $10.56 in 1978.[4] This gain of almost 150% exceeds the 80% increase in the consumer price index during this same period. Since such increases typically are applied to past as well as to future service credits, these figures indicate that real pension credits have in fact risen. Data do not permit a corresponding calculation for career average plans, although the frequency of improvements to accrued pension credits during active service is a well documented fact.

Policy-makers may decide that the informal, retroactive improvements to offset the impact of inflation which frequently occur in career average plans should be formalized. This concern is less immediate for flat benefit plans, since the terms of these plans are periodically revised through formal collective bargaining. On balance, as implied by the previous discussion, the need for policy initiatives is easily overstated. The strongest argument for action may be that of parallelism if initiatives - such as requiring that deferred annuities be costed at a real interest rate - are undertaken to preserve the real value of the pension benefits of terminated, vested employees. If sponsors of career average and flat benefit plans are required to use real interest rates to value their plans, as discussed at length in the second part of this report, they would - in effect - be forced to pre-fund the retroactive, nominal benefit improvements that now occur. The major advantage of this initiative may be to improve the degree of funding - and hence the security of benefits - in flat benefit plans (especially), rather than improving upon the present arrangements for preserving the real value of accruing benefits during the pre-retirement period. A final observation merits note. The Task Force, as part of its concern that there be a "fair" relationship between contributions and benefits for each plan member, suggests that final earnings (or best average) plans be actively discouraged. This recommendation may seem somewhat paradoxical in view of the fact that the final earnings formula does preserve the real value of accruing benefits in the pre-retirement years. The recommendation reflects the Task Force's concern that those employees with steep earnings profiles enjoy a much higher ratio of benefits to contributions under the terms of such plans than do those with flat earnings profiles. In the opinion of the present author, this concern - and certain of the policy recommendations that stem from it - is overstated. This concern is unfounded so long as employers correctly assess the implications for pension benefit accruals of the wage or salary increase paid to a member of a final earnings plan. The

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4. Calculated by the author from data compiled in Statistics Canada, Pension Plans in Canada 1978.

existence of the final earnings plan implies that the rise in total compensation will exceed the rate of increase in the worker's wage or salary. So long as this result is correctly factored into the wage offer, there is no reason - on economic grounds - to be concerned with the "fairness" issue.

Portability

An employee has a portable pension if the pension credits that he earns with his prior employer are transferrable to the plan offered by his new employer. Pension credits earned under the terms of the C/QPP are portable, while - with some exceptions - pension credits in occupational plans are not. Those concerned with pension reform note that if mobile workers are to derive any substantial retirement income from occupational pension plans, then progress on this front is imperative. Earlier vesting is a necessary, but not sufficient, requirement if the situation of the mobile employee is to be improved. At present, the deferred annuity that a terminating (vested) employee receives is likely to be seriously eroded by inflation which occurs both during his active work and his retirement years. If the multiplicity of benefit formulas were to make the design of a truly portable pension benefit impossible, then - at the very least - the updating of deferred pensions is required. Significantly, the ad hoc increases now frequently provided by employers to pensions in force are not extended to deferred pensions. Quite simply, employers are not concerned with the well-being of terminated active workers.

The Task Force recommends that one of two schemes be adopted to update deferred pensions, depending upon the benefit formula. For a final or best average earnings plan, the Task Force recommends that the deferred pensions earned by a terminating plan member be revalued between the termination date and normal pensionable age by an appropriate wage and salary index. For all other defined benefit plans, the vested benefits are to be updated by an amount no less than the amount by which the benefits would have been updated had the employee remained at the same job. The latter attempts to gain for terminated employees the same benefit provided active members by the periodic amendments that are typically made to career average and flat benefit plans. This latter proposal in particular is not likly to prove workable, and both are likely to be resisted - with some justification - by employers.

Assume that labour markets are perfectly competitive and hence that workers must receive in each period total compensation equal to the market value of their labour services. If - as part of an increase in total compensation paid to active workers - the

employer enriched the pension benefit formula, he would be required to make additional payments on behalf of terminated, vested employees. There is no incentive for active workers to make wage concessions to offset these additional payments. Employers would thus have a strong incentive not to enrich pension benefit formulas, but to increase the compensation paid to active workers only by increasing their current wages. If the purpose of the initiative is to extend to terminated employees the improved pension benefits accorded active employees, it will fail. Indeed, by actively discouraging employers from enriching their benefit formulas, it will counter the intent of proposed pension reform since it will work to reduce the delivery of retirement incomes by occupational plans. If the wage and salary index used to update the vested benefits of members of final earnings plans is an economy-wide index, as suggested by the Task Force, the analogous disincentive is removed. The difficulty with this proposal is that it fails to recognize that real wages across firms do - and should continue to - vary in response to market forces. For those industries in which market conditions dictate below average increases in real wages, perhaps for extended periods, the prospect of requiring the employer to provide - in effect - larger increases in pension benefits for terminated than for active employees is difficult to justify.

There is an alternative means by which - at least in principle - deferred pensions could be insulated from inflation and which could, if required, be extended to provide for real increases in these vested benefits. The proposal stems again from the recognition that if sufficient funds are to be set aside to preserve a pension benefit in real terms, the appropriate benchmark is that of a non-inflationary economy. Quite simply, sponsors of defined benefit plans would be required to cost the deferred annuities payable under the terms of their plans on the basis of a real interest rate. To the extent that prevailing markets rates are higher by virtue of their incorporation of an inflation premium, the capital sum implied by the real rate will be more than that required to buy a fixed-dollar deferred annuity. The surplus, in effect, is to provide the amount necessary to offset the eroding impact on the real value of the pension implied by the expected rate of inflation - as reflected in the market interest rate - at the time the deferred annuity is purchased. The transfer of the present value of the deferred annuity, calculated at a real rate, to a "locked-in" RRSP would preserve - at least in principle - the real value of the benefit during both the employee's active work and his retirement years. The result parallels the use of performance indexing as a means of providing cost-of-living protection for pensions in pay. As before, performance could be replaced by contractual indexing if the Federal government were to adopt one of the procedures cited earlier for assuming the attendant inflation risk. Given the

emerging consensus that performance indexing may be the minimum step required to preserve the real value of pensions in pay, this is logically the minimum step necessary to provide analogous protection for deferred pensions.

If it were thought appropriate to provide - at least in principle - for the real value of the deferred pensions to be updated over time, a simple variant of the above proposal would accomplish this objective without creating the disincentive effects previously. Suppose that the real interest rate employed to capitalize the defined benefit is (say) 3 percent. If one wanted to provide the terminating employee with sufficient funds so that the real value of his deferred pension could be increased, this could be accomplished by simply lowering this discount rate. If the rate were lowered to 2% (which would then raise the capital sum necessary to pay for the defined benefit), then - in principle - the real value of the deferred pension could rise at one percent a year during both the employee's active work and retirement years. If the 2% rate were applied only to the period between the date of termination and normal retirement age, but the 3% used to calculate the value of the annuity itself, then the capital sum would be sufficient to permit the real value of the deferred pension to rise by one percent per year through the date of retirement and to remain constant in real terms thereafter. Again, the "in principle" caveat is in order since the improvement is analogous to that of performance rather than contractual indexing. Since parallel reforms call for pensions in pay to be price indexed only, the second variant above is the logical form of implementing this alternative updating scheme. Like the updating of deferred pensions in line with an economy-wide wage or salary index, this scheme could result in those with deferred pensions receiving larger real increases than do active plan members. The result is somewhat less visible, and the quid pro quo is that those with deferred annuities remain subject to the investment risks which accompany performance indexing.

Finally, the use of a statutory real interest rate to cost deferred annuities payable under the terms of defined benefit plans could be the centerpiece at a scheme to provide fully portable pension credits. Since the accrued benefits of the terminated employee are all that is relevant, no salary scale is required to calculate the lump sum payment necessary to purchase the deferred annuity. The problem of providing portable benefits then reduces - as a first approximation - to calculating the number of years of pensionable service that this lump sum can purchase - given the age of the employee - under the terms of the plan provided by the new employer. Since not all employers offer pension plans, the option of transferring the capital sum necessary to purchase the deferred pension to a "locked-in" RRSP must remain available.

Survivorship Provisions and the "Splitting" of Pension Credits

The fact that women constitute a very high percentage of the poor among the current elderly has been a major concern to those advocating pension reform. Programs directed toward the goal of alleviating the incidence of poverty among the aged, such as an increase in the GIS targeted toward singles who live in unsubsidized rental housing, will be the most effective in improving the circumstances of the current elderly poor. One proposed reform plan which would, over time, improve the situation of elderly women (in particular) is to require occupational plans to provide a standard survivorship benefit.

If mandatory survivorship provisions are introduced, they could have one of two forms. Either the retiring, married employee could be required to take an appropriate actuarial reduction in the pension benefit, or the survivorship provision could be automatic in the sense that no such actuarial reduction would be required. Under the first option, there would be no income redistributive effects between single and married employees. Under the second, married would benefit at the expense of single employees. The first option could be introduced retroactively. If the second option were introduced retroactively, there would be an additional redistributive effect in favour of old at the expense of young employees. This effect would occur because the higher contribution rate necessitated by the improved benefit is paid - either directly or indirectly in the form of current wage concessions - for only a short time by those at or nearing retirement age.

There is a strong argument on income redistributive grounds for preferring the first option: married employees should be required to take an actuarially reduced pension. The dramatic increase in the participation rates for women, and the relative affluence of two-income versus single-income households, raises the question at whether the adoption of the second option might also redistribute income from lower to higher income households. Both working spouses would, in this case, have unadjusted pensions with a survivorship provision. In this context, it is useful to note the Council's projection that the proportion of women aged 65 and over who will not be beneficiaries of a retirement (as opposed to a survivor's) pension under the C/QPP will fall from 68% in 1981 to 12% by the year 2031. The amendment proposed by the Government of Saskatchewan to its Pension Benefits Act would require that plans provide for at least a 50% surviving spouse benefit with a corresponding actuarial reduction in the benefit of the retiring, married employee. (The proposed amendment, in addition, allows the spouse to waive his or her right to this survivor's benefit so that the retiring employee may receive an unreduced pension.)

Funding and the Security of Benefits

The degree of funding in occupational pension plans in the private sector, and ultimately the security of the benefits so promised, has received relatively little attention. The Task Force acknowledges the fact that large unfunded liabilities are prevalent in flat benefit plans, and recommends that accelerated funding be required for those plans with large unfunded liabilities.

The issue of the security of benefits in flat benefit plans (in particular) is discussed at length in the second section of this report in conjunction with the recommendation that plans be required to value both accruing benefits and annuities payable under the terms of the plan on the basis of a real interest rate, as would occur in a non-inflationary climate. Still, a number of observations merit note at this time. First, the absence - through firm insolvency or major plant shutdowns - of a well-publicized plan termination in which employees fail to receive the full value of their vested benefits has - until very recently - placed this issue "on the back burner". Since plan provisions typically limit the employer's obligation to the lesser of vested or funded benefits, the above situation could well occur if an underfunded flat benefit plan were terminated. Second, although none of the earlier studies advocated the introduction of plan termination insurance, recent plant shutdowns in Ontario have produced political pressure to provide such insurance. Because of subleties surrounding employee valuation of pension claims, including the possibility that employees discount the value of unfunded benefit improvements by granting *cet. par.* smaller wage concessions than for funded benefit improvements, the economic case for introducing retroactive termination insurance is not firmly established. Such insurance could arbitrarily redistribute wealth from shareholders to employees with past service credits *if* (1) employees had previously discounted the value of poorly funded pension benefits and (2) competitive pressures ensure that workers always receive the full value of their current labour services. In general, the desirability of introducing termination insurance is not clear and the issue merits careful study. Third, as discussed in the second part of this report, requiring that sponsors use a real interest rate to cost their plans would - in effect - ensure that the retroactive, nominal benefit improvements in flat benefit plans would be pre-funded. This policy initiative would reduce the need for plan termination insurance and might prove to be a satisfactory means of enhancing the security of promised benefits.

Coverage

Data compiled by Statistics Canada indicate that in 1976 only about 50% of paid, full-time workers in the private sector between the ages of 25 and 64 were members of occupational pension plans. Coverage in the public sector, by contract, was virtually 100%. Within the private sector, certain systematic paterns exist. Coverage ratios are much below average in the wholesale and retail trades, the service sector and in agriculture. Almost all large employers in the private sector offer pension plans, while many smaller firms do not. Of particular relevance is the apparent fact, distilled by the Task Force on the basis of income tax records, that those whose employment earnings are low are less likely to be members of occupational pension plans. Both the Task Force and the Council draw attention to the fact that, because of their relative concentration in those industries (such as retail trade) where coverage is low, the percentage of women who are members of occupational plans is less than the percentage of men. The Task Force estimates that somewhat less than 60% of men aged 25 to 64 who are paid workers in the private sector belong to occupational pension plans, compared to 33% of women.

Clearly, proposed reforms of occupational plans will do nothing to improve the situation of those who are not members of such plans. The Council does not recommend, however, that coverage be made mandatory. Instead, the Council urges that "a co-ordinated plan be established by the federal and provincial governments to induce the extension and improvement of occupational pension plans". The third (mandating occupational plans subject to minimum benefit standards) and fourth (enlarging the C/QPP) options analyzed by the Task Force, by contrast, would effectively improve pension coverage.

Mandated improvement in pension coverage might, in fact, confer relatively little benefit on those affected. Note first that if employers are required to offer plans, the incidence of employer contributions will - according to received economic theory - fall ultimately on the employee.[5] Workers, including many at the lower income levels, will thus be required to allocate a larger fraction of their lifetime earnings to provide for consumption during their retirement years. On the other hand, this initiative will reduce gradually and over time

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5. This result is noted by the Task Force (Report, page 165) in its discussion of the costs of alternative pension reforms, although the casual reader could easily lose sight of this important acknowledgement.

the likelihood of future claims on income-tested programs such as GIS and the various provincial "top-offs". On the other, by forcing low-income individuals to provide cet. par. a larger share of their own retirement incomes, this initiative may redistribute income away from those with low lifetime earnings. This could lead to pressure for tax credits or other government assistance to ease the burden of the proposed reform on low-income workers. Legislating mandatory coverage (with employer contributions) would also be equivalent to increasing the minimum wage since the incidence of employer contributions could not be shifted to the workers so affected. The traditional analysis of the impact of increasing the minimum wage, including the prediction that at least some low-paying jobs would disappear, would be relevant.

Employers who are not members of occupational plans have the option of contributing to RRSPs. To the extent that low-income Canadians choose not to contribute to RRSPs, their revealed preference for current consumption is clear. (Given the low value to them of the tax subsidy associated with RRSP contributions, together with the likelihood that they would be substituting their own saving for retirement for benefits otherwise available for income-tested public programs, this decision is probably rational.) For other workers who are not members of occupational plans, the fact that they can contribute to RRSPs if they so choose merits emphasis.

3. POSSIBLE EXPANSION OF THE CANADA/QUEBEC PENSION PLAN

Coverage under the C/QPP is universal, vesting is full and immediate, pension credits are fully portable, and pensions in pay are fully indexed to inflation as measured by the consumer price index. Not surprisingly, many - such as the Senate Committee and the 1978 Quebec Task Force - have argued that the expansion of the C/QPP is the most logical means of achieving the income replacement objectives of retirement income policy. Although sentiment appears to favour the preservation of the present mix between public and occupational plans, it is useful to review briefly the central issues regarding the possible expansion of the C/QPP.

In certain respects, extension of the C/QPP would have effects similar to those which would accompany the introduction of mandatory occupational plans. Parallel concerns exist, for example, regarding the questionable net benefit to households with low lifetime earnings. The essential difference relates to the method by which benefits would be financed. Occupational plans would, of course, be funded. The Economic Council raised and (at least temporarily) rejected the possibility of a fully funded supplement to the C/QPP. Those who dissented from the majority recommendations in the Council's report favoured the introduction of a fully funded supplement to the C/QPP. The

logic for requiring that any expansion of C/QPP benefits be fully funded is to prevent required contribution rates for Canada's public pension programs from rising too dramatically in the years ahead. Even if C/QPP benefits are not expanded, the required contribution rates must inevitably be increased. This fact, combined with (1) the pay-as-you-go funding of OAS/GIS and (2) the significant ageing of the Canadian population that will occur in the years ahead, indicates that contribution rates that workers in the future will have to pay in order to support these programs will be significantly higher than they are today. The Council estimates, for example, that if present C/QPP, OAS and GIS benefits are (only) preserved in real terms, then the fraction of GNP necessary to meet this commitment will rise from 3.1% in 1981 to 5.2% in 2031 under medium demographic projections. If OAS and GIS benefits are indexed to wages rather than prices, so that the beneficiaries of these programs share future increases in productivity, this ratio would rise to 7.3% or to more than double its present level. The contribution rate for the C/QPP, if financed on a pay-go basis after the investment fund is exhausted (around the turn of the century), will rise from the present 3.6% to 10.0% of covered earnings in 2031. In view of these figures, and the possibility that any expansion of C/QPP benefits without a commensurate increase in contribution rates might depress personal saving, the consensus view is that any expansion of benefits under the C/QPP must be funded in advance.[6] Today's workers, in short, must save for their own incomes to provide for any further increase in retirement income through these earnings-related public plans. Finally, if an expanded C/QPP were funded on a pay-go basis, implying significantly higher contribution rates as the proportion of retired to active workers increased in the years ahead, the scope for future increases in the real level of benefits provided by OAS and GIS (in particular) might be limited. Since the latter programs are likely to prove more effective in addressing

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6. The Senate Committee recommended that the ceiling under the C/QPP be raised by 50 percent to 1-½ times the average industrial wage and that contribution rates be raised from the present 3.6 percent to 8 percent of covered earnings, to be phased in over a period of two years. The Quebec (Cofirentes) Report recommended in 1978 that the income-replacement rate be raised from 25 to 50% of the first half of the maximum pensionable earnings while remaining at 25% for the second half. For a worker whose earnings are at the maximum earnings level, the replacement rate would thus be 37.5%. The Committee also recommended a corresponding increase in the contribution rate, which would be set at 6.8 percent for the next five years, with modest increases to follow.

the problem of poverty among the aged, the case for funding any expanded C/QPP benefit is strengthened.

Finally, the potential difficulties - political and economic - concerning the investment of CPP funds merits note. At present, the excess of CPP contributions over benefit payments are lent by formula to the provinces at below-market rates of interest.[7] If contribution rates are not increased, the cash flow to the provinces will become negative in the middle to late 1980's as the provinces begin to repay outstanding loans to the CPP. The provinces may be expected to campaign for increases in the CPP contribution rate, even if benefits are not expanded, in order to gain continued access to CPP investment funds. The present situation highlights the potential difficulties posed by the possible expansion of CPP benefits with attendant increases in contribution rates. There is no reason why contributors to the CPP should continue to subsidize current and future taxpayers of the respective provinces by accepting below-market returns on their investments. Yet the provinces, which benefit from the present arrangement, are likely to resist this change. Contributors to the CPP would be best served if the accumulating funds could be invested in private as well as public securities. Yet the provinces would likely insist that at least some specified fraction of CPP funds be earmarked for them. Finally, there remains the difficult problem of administering the large fund that would accumulate under a fully funded supplement to the C/QPP without permitting an undue encroachment of government influence on investment activities in the private sector.

In view of (1) the impending reform of occupational plans and (2) the questionable advantage to households with low lifetime earnings of C/QPP expansion, this option for reform is perhaps less necessary and less attractive than it might at first appear.

4. RELATED ISSUES

Occupational Plans in the Public versus the Private Sector

Pension benefits, such as vesting and survivorship provisions, are typically more generous in public sector plans.

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7. The provinces pay an interest rate equal to the rate on Government of Canada bonds with a maturity of 20 years or more, which is less than the rate that they would have to pay in the open market.

Many public sector plans (presently) provide for the full and contractual indexing to the consumer price index of pensions in pay. This feature is virtually absent in private sector plans.

Since pension benefits - as deferred wages - are just a part of the employee's total compensation package, economic analysis tends to downplay the importance of comparing the level of pension benefits per se. If comparisons are to be made, then they should focus on total compensation. The only exception to this rule occurs if a particular benefit is available only in the public sector. Full and contractual indexing, in particular, may rest ultimately on the government's ability to underwrite the attendant inflation risk by virtue of its taxing authority.[8] For this reason, parallelism with respect to this particular feature of plan design may be in order. If performance rather than contractual indexing is deemed to be satisfactory for private sector plans, then the replacement of contractual by performance indexing in the public sector would be appropriate. Indeed, this is the thrust of recent initiatives proposed both by the Federal government and the government of British Columbia. If the Federal government provides a vehicle (say, price-indexed annuities or a stabilization facility) to enable private sector plans to provide full and contractual indexing, then the present provisions in the public sector plans should be retained.

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8. If fully indexed benefits are to be paid with certainty by a private sector plan, then (1) the plan must be fully funded in view of the possibility of firm insolvency and (2) the funds must be invested in a portfolio whose real return is certain. In practice, (2) cannot be met, although it can be approximated if the plan's funds are invested exclusively in Treasury bills or commercial paper. They would then earn a real return of (approximately) one percent. From this perspective, employees in the private sector are not sufficiently risk averse that they are willing to earn only a one percent real return on foregone wages (and hence for the plan to be costed at one percent) in order to obtain fully indexed benefits. If the indexing provisions in public sector plans are to be valued in parallel fashion, then the benefits payable under the terms of those plans must also be costed at one percent. Since this is not the current practice, it can be concluded that the value of this benefit in public sector plans is being underestimated. This is an alternative way of making the point in the text. If indexing provisions in the public sector were appropriately valued, as above, then the need for parallelism as discussed in the text would be negated.

Mandatory Retirement

Perhaps unfortunately, as noted by the Economic Council, the issue of mandatory retirement has become the focus of the retirement age issue. The relevant facts are these: (1) the continuing trend is toward earlier retirement; (2) there is no hard evidence that significant numbers of workers are being forced to retire because of mandatory retirement provisions; and (3) the elimination of mandatory retirement would create the need for alternative, more costly, and potentially disruptive dismissal rules.

Not surprisingly, the Senate Committee recommended a ban on mandatory retirement provisions. The Task Force takes a somewhat eclectic approach, arguing that the burden of proof in future discussions be shifted from those who wish to abolish mandatory retirement to those who wish to retain the practice. The Council opposes its formal abolishment, and predicts that mandatory retirement will gradually be eliminated through market forces as the number of older and experienced workers rises relative to the number of new entrants to the labour force. The Council prefers, instead, that the various levels of government promote policies - perhaps including more flexible hours - which would expand job opportunities for older workers.

Although those who have studied the issue of mandatory retirement are, at the very least, more cautious in advocating its abolishment than the prevailing political climate might suggest, its abolishment remains possible, if not probable. Two points merit emphasis. First, the elimination of mandatory retirement will not of itself reduce the implicit tax burden on future taxpayers associated with the pay-go financing of today's public pension programs (i.e. OAS/GIS and C/QPP). Those who make this argument implicitly assume that one or more of the following benefit retrenchments will accompany a ban on mandatory retirement: (1) the age of entitlement of OAS/GIS will be raised, at least for those who choose to work beyond age 65; (2) benefit payments under the CPP/QPP benefits. Further, if one of these options is adopted, the effective tax on earnings (i.e. the reduction in public pension benefits) may serve as a major deterrent to work by those beyond age 65. Second, if mandatory retirement is banned, attention must shift to the treatment to be accorded workers who choose to work beyond the date at which they are entitled to pensions from their employer. Note, for example, that if both service credits and contributions were to cease at normal retirement age under the plan, with the employee receiving an unadjusted pension commencing at his retirement date, then there would be a strong disincentive for the employee to work past the normal retirement age.

On balance, the issue of mandatory retirement is for less central to improving Canada's retirement income system than is often suggested. Equally important, surveys indicate that - at present - a major input into many employees' desire to work past age 65 is the uncertainty surrounding the real value of their occupational pensions. Reforms designed to improve the cost-of-living protection accorded pensions in pay should, at least after a transitional phase, eliminate this "by default" motive for employees' seeking to extend their active work lives.

5. POLICY RECOMMENDATIONS

(1) The discussion highlights the fact that the problems posed by inflation for occupational pension plans in the private sector raise important questions regarding the adequacy of this element of the retirement income system. The analysis identifies, first and foremost, the importance of costing the pension benefit formula against the benchmark of a "non-inflationary" environment so that both the employer and plan members correctly perceive the true cost of the benefit if it is - at least in principle - to be preserved in real terms in both the accrual and the retirement period. These costs, which plan sponsors and their consulting actuaries should be required to calculate, represent a crucial input into the design of the benefit formula.

At present, most employer-sponsored plans are valued on the basis of interest rate assumptions which imply that the contribution rates so established can be realized only if both accruing benefits and pensions in pay are eroded by the inflation rate implicit in the interest rate assumption. The use of a real interest rate of (say) 3% to value both current and deferred annuities payable under the terms of the plan would identify the cost of indexing benefits in pay. The use of a real interest rate to value accruing benefits (with the corresponding use of a real salary scale, if required) would identify in addition the cost - again in principle - of price indexing the accumulating credits of active employees. For flat benefit and career average plans in particular, the required increases in contribution rates if accruing benefits are to be preserved in real terms are likely to be considerable. The basic postulate is that only when sponsors and their employees are fully cognizant of these costs will they choose an appropriate benefit formula. As discussed at length in the second part of this report, the cost of indexing post-retirement or pre- and post-retirement benefits may lead at least some plan sponsors and their employees to agree to "scale down" basic pension benefits.

The use of a real interest rate to value according benefits, in addition, will improve the delivery of retirement incomes by employer-sponsored plans in three related ways. First, by requiring that the annuity payable to be vested, terminating employee be costed on the basis of real interest rate, this innovation will of itself greatly enhance the effectiveness of any move toward earlier vesting. Second, if the capital sum required by this calculation is transferred to a "locked-in" RRSP, the effective portability of benefits for the mobile employee will be greatly enhanced. In particular, the sum transferred to the RRSP will be sufficient - at least in principle - to insulate the real value of the defined benefit against inflation which occurs both before and after the employee retires. Third, by requiring in effect that the nominal, retroactive benefit improvements which typically occur in flat benefit (especially) and career average plans be prefunded, the use of a real interest rate to value accruing benefits will increase the degree of funding in such plans and hence the security of the benefits so provided.

(2) Performance indexing, in which the inflation-augmented or "excess" investment earnings above (say) 3% are applied to escalating benefits in pay, is likely to provide adequate cost-of-living protection in all but the most adverse (i.e. continually accelerating inflation) circumstances. Full and contractual indexing of benefits in pay by employer-sponsored plans in the private sector will require a parallel initiative by the federal government to assume the attendant inflation risk. The federal government could issue index bonds, sell price-indexed annuities, "stabilize" real returns or provide inflation insurance. On balance, the likelihood that performance indexing if appropritely designed will deliver adequate cost-of-living protection, together with the administrative costs (and possible ramifications) of the government initiaties to facilitate contractual indexing, suggest that performance indexing be given serious consideration.

(3) If contractual indexing is introduced for employer-sponsored plans in the private sector, then it should remain in public sector plans as well. If performance indexing is introduced for private sector plans, then it should also replace contractual indexing in public sector plans.

The reason for parallelism stems ultimately from the fact that - at present - plan sponsors in the private sector do not have access to an investment vehicle which would permit them to introduce contractual indexing. If the taxing power of government is ultimately required to underwrite the inflation risk that accompanies contractual indexing, then to limit its accessibility to public sector plans is difficult to justify. The fact that performance indexing is likely to provide

adequate - if not complete - protection against inflation again merits note. Pertinent also is the fact that there typically exists in the public sector a supplementary plan to provide for the indexing payments. This practice greatly complicates the problem of determining - again in principle - whether the contribution rates are set at a sufficiently high level to fund indexed benefit payments. The use of a real interest rate to value the benefits payable under the combined plan would be more useful in this regard.

(4) The move toward earlier, if not immediate, vesting appears to be inevitable. Although there are important caveats regarding the economic impact of this initiative, it should logically be accompanied by the requirement that the capital sum necessary to purchase the deferred annuity be transferred to a "locked-in" RRSP. Further, if the real value of the defined benefit is to be preserved, the capital sum should be determined using a real interest rate of (say) 3%. If the mobile employee belonged to plans with an earnings-related benefit formula, the actual pension would resemble the benefit provided by a career average plan in which each year's earnings had been updated for inflation. Sufficient funds would exist, again in principle, to fully preserve the real value of this benefit during the employee's retirement years.

Even with the use of a real interest rate to capitalize the requisite annuity, the advantage conferred by earlier vesting to the young employee in a contributory, defined benefit plan may still be illusory. In practice, a scheme could be developed - such as that devised by Saskatchewan in a proposed amendment to its Pension Benefits Act - whereby the employee's own contributions with interest cannot purchase more than 50% of the promised benefit. Any excess would be returned to the employee, while the capital sum necessary to purchase the annuity is transferred to a "locked-in" RRSP.

(5) The achievement of truly portable pensions, in which the pension credits of the terminating employee are transferred to the plan provided by his new employer, will be difficult - but not impossible - to achieve. By requiring that benefits be valued at a statutory - and thus standard - real interest rate, the previously discussed initiative would facilitate the actuarial calculation of the lump sum payment required from the initial employer if the credit earned under the terms of the plan is to be transferred to the plan offered by the new employer.

Requiring that the deferred annuity payable to a terminating employee be valued on the basis of a real interest rate and the corresponding capital sum transferred to a

"locked-in" RRSP would solve most of the problems posed by the absence of truly portable occupational pensions. There appears to be little merit in the schemes proposed by the Task Force on Retirement Income Policy to update the value of deferred pensions. For flat benefit and career average plans, the proposal is that deferred pensions be updated by an amount no less than the amount by which the benefits would have been updated had the employee remained at the same job. The proposal would serve as a strong disincentive for employers and their active employees to include plan improvements as part of the employees' compensation package. The objective of providing sufficient funds, at least in principle, so that deferred pensions can increase in real terms can be achieved by an appropriate reduction in the real interest rate used to calculate the capital sum necessary to meet the defined benefit.

(6) The introduction of a mandatory benefit for the surviving spouse would improve the retirement income provided elderly women in particular. To prevent the arbitrary redistribution of wealth (for example, from single to married employees), the defined benefit should be actuarially reduced for the married employee at the time of retirement.

Requiring that a mandatory provision for the surviving spouse be linked to an unreduced pension for the married employee not only ignores these distributional effects, but also the changing labour force status of married women in particular. Significantly, both the Economic Council of Canada and the Government of Saskatchewan in proposed amendments to its Pension Benefits Act explicitly support the actuarial reduction of the pension provided a married employee if a mandatory survivor provision is introduced.

(7) The absence of a well-publicized plan termination (by firm insolvency, plant shutdown, etc.) in which employees fail to receive the full value of their vested benefits has placed - perhaps inappropriately - the issue of the security of benefits "on the back burner".

Since plan provisions typically limit the employer's obligation to the lesser of vested or funded benefits, the above situation could well occur if an underfunded flat benefit plan were terminated. The prior recommendation that plan sponsors be required to value annuities payable under the terms of the plan as well as accruing benefits on the basis of a real interest rate will effectively require plan sponsors to prefund the nominal, retroactive benefit improvements that periodically occur in the union sector. As a result, the funded status of flat benefit plans will gradually improve, thus reducing both the likelihood of a catastrophic plan termination and the attendant likelihood of a hurried and more dramatic policy initiative.

(8) Previously discussed initiatives designed to improve the delivery of retirement incomes through occupational plans will do nothing to assist those who are not covered by (i.e. are not members of) such plans.

Economic analysis indicates that the ultimate incidence of mandated employer contribution will likely fall upon the employee. Mandating employer-sponsored plans (or increasing the benefits and contributions to the earnings-related C/QPP) will force low-income workers to allocate a higher fraction of their lifetime earnings to providing for their own retirement. Because of the reduced access to income-tested programs such as GIS and the various provincial "top-offs", low-income workers may in fact be less well off than they are under the present system. So long as the various levels of government encourage the growth of occupational pension plans, and so long as the Federal government retains sufficient flexibility to improve over time the real level of benefit provided by the GIS, the more dramatic initiatives of either mandating employer-sponsored plans or expanding the C/QPP can probably be avoided without greatly compromising the objective of improving the delivery of retirement incomes.

(9) If the decision is made to expand the C/QPP with or without the option for employers who offer plans which meet minimum defined standards to "contract out", there is strong argument for requiring that the supplement be fully funded.

The inherent problems associated with introducing a fully funded supplement to the C/QPP, together with the attendant expansion of the role of government, will suggest to many that mandated occupational plans might be preferred. Again, however, the net benefit to low-income workers is questionable, and there exists the likelihood that the effectiveness of the retirement income system can be enhanced without requiring so dramatic an initiative.

(10) Pension benefits, on the whole, are richer in public than in private sector plans. If public sector employees either choose or are required to devote a higher fraction of their total compensation in the two sectors is equal - the comparison of pension benefits per se of limited usefulness. The crucial issues then become: (1) can employers in the private sector offer comparable benefits, given their need to finance benefits from earnings rather than from tax revenues; and (2) are employers and employees appropriately valuing the benefits - especially the indexing provisions - in the context of their total compensation package?

Parallelism with regard to cost-of-living protection to pension in pay would appear to be appropriate. Performance or contractual indexing should characterize both public and private sector plans. For other benefits which could easily be provided by private sector plans, such as richer survivorship provisions, the case for parallelism is far less compelling.

(11) The fact that the issue of mandatory retirement has become the focus of the debate regarding retirement age is perhaps unfortunate. The continued trend toward earlier retirement, the lack of hard evidence that large numbers of employees are being involuntarily retired, and the need for alternative, more costly and potentially disruptive dismissal rules if mandatory retirement is prohibited receive too little attention.

Given the likelihood that (1) improved cost-of-living protection to pensions in pay will reduce the "default" motive for delayed retirement and (2) market forces will lead to the gradual disappearance of mandatory retirement if the situation is warranted, the need for immediate action on this front is far less compelling than on most of the issues raised in this report.

1. ANALYSIS OF INTEREST RATE AND SALARY SCALE ASSUMPTIONS

Introduction

If sufficient funds are to be set aside - at least in principle - for the benefits payable under flat benefit, career average and final earnings plans to be fully indexed against inflation, then the annuities payable under the terms of such plans must be valued or costed at a real interest rate. If a plan is costed on the basis of a nominal rate which contains an inflation premium, then the required contribution rate is set on the implicit assumption that the real value of pension claims will be eroded by inflation which occurs in the retirement period and - in most cases - in the pre-retirement period as well. Assuming that the salary scale assumption (if applicable) embodies the same inflation factor as does the interest rate assumption, the use of a nominal interest rate to cost the plan and thus to establish the required contribution rate implies - with the sole exception of a final earnings plan in which the benefit is tied to earnings in the very last year of employment - that the real value of accruing benefits will be eroded by inflation which occurs in the employee's active work years. Thus the fact that a high interest rate assumption may be accompanied by a high salary scale assumption is not in general sufficient to guarantee that the contribution rate is set sufficiently high to preserve the real value of accruing benefits.

For terminated vested employees, the implied erosion of the real value of the deferred pension is directly analogous to that of a retired employee who begins to draw his current, fixed-dollar annuity. Indeed, because the annuity of the terminated employee is deferred, the impact on the capital sum required to purchase the annuity payable under the terms of the plan is far more dramatic if a nominal rather than a real rate is employed because the interest factor applies both to the annuity itself and to the period from the worker's termination to the commencement of the pension.

Historical data suggest that the real return that might reasonably be earned by a representative pension fund in Canada is not likely to exceed 4%. For the fixed-income portion of the portfolio, the real return is not likely to exceed 3%. From this perspective, it is useful to examine the interest rate assumptions that have been employed by plan sponsors to formally value and thus cost the benefits payable under the terms of their plans.

The Valuation Assumptions

Data on the interest rate assumptions employed to value pension liabilities are readily available from two sources: surveys conducted by the Pension Commission of Ontario in 1972, 1975 and 1978 of the large pension plans under its supervision, and a more recent survey conducted in the fall of 1979 by the Financial Executives Institute Canada (FEIC). Because the dates of the actuarial valuations vary over a smaller range, and since figures are available by benefit formula, the FEIC data probably provide a more accurate picture of present interplan variation in valuation assumptions. The Commission's data, in addition, illustrate the variation in the interest rate assumption that has occurred over time. The Commission's and the FEIC data are summarized in Tables 1 and 2, respectively. The Commission's data include a few public sector plans, whose assumptions are representative of the population as a whole, while the FEIC data consist exclusively of plans in the private sector.

Both sets of data highlight the apparent latitude[1] plan sponsors and their actuaries enjoy in choosing their valuation assumptions. The Commission's surveys also indicate a secular increase in the interest rate assumption over time, as the mean assumption rose steadily from 4.34% in 1969 to 5.45% in 1978. The FEIC data highlight the cross-sectional variation, which is apparently common to all benefit formulas. The grand mean assumption of 5.56% is slightly higher than the corresponding figures in the Commission's 1978 survey, presumably reflecting the continued upward movement in long-term interest rates.

Finally, as evidenced by figures reported in Table 1, the vast majority of plans are costed on interest rate assumptions which are significantly less than current market rates, as represented by the yield on long-term Government of Canada bonds.

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1. At present, the Department of National Revenue, which is concerned with limiting access to the tax subsidy accorded plan contributions - requires "normally" that the interest rate assumption not exceed the salary scale assumption. The Pension Commission of Ontario, for its part, discourages the use of an interest rate assumption in excess of 7% and will only permit such rates on rare occasions. Although not shown, the mean spread between the interest rate and salary scale assumptions appears to have declined in recent years, implying cet. par. higher contribution rates. The Commission's data indicate, for example, that this mean spread fell from 2.14% in 1972 to 1.13% in 1978.

On the premise (to be explored later) that these recorded valuation assumptions are those used by sponsors and their employees in valuing pension claims in the context of employee compensation, a number of important observations are in order. First, since the valuation assumptions typically exceed the likely ceiling on the real interest rate, the plans are being costed on the implicit assumption that the real value of pension claims will be eroded by inflation when they become payable. Indeed, for flat benefit and career average plans, the inference is that the real value of pension claims will be eroded by inflation even as they accrue during the plan member's work years. Second, there is substantial interplan variation in the interest rate assumption, indicating that mandatory indexing - whether contractual or performance - will have cost implications that vary sharply across plans. Third, the vast majority of plans are costed on interest rate assumptions which are significantly less than current market rates. Industry spokesmen might attribute this result to the inherently "conservative" nature of actuarial valuations. A possible economic interpretation - to be explored later - is that plan sponsors act as if they have an implicit commitment to make cost-of-living adjustments to the extent that the investment return on the plan's assets exceeds the interest rate assumed in the actuarial valuations.

Final earnings plans together with a career average plans funded on a level premium (projected benefit) basis require a salary scale assumption. Inspection of the data underlying Tables 1 and 2 indicates that those plans which use a high interest rate assumption also use a high salary scale assumption, and conversely. In the cost simulation exercises reported later in this study, the spread between the (reported) interest rate assumption and the salary scale assumption is treated as constant. As noted, with the sole exception of an "extreme" final earnings plan, pairing a high interest with a high salary scale assumption to cost a plan does not produce a contribution rate which is sufficiently high to preserve - in principle - the real value of accruing benefits. It should also be emphasized that the use of a high interest rate assumptions is not confined to plans which also use a salary scale assumption. In the Commission's 1978 survey, for example, the mean interest rate and a salary scale assumption, compared to 5.37% for those plans which reported only an interest rate assumption.

Finally, there is no reason to believe that the figures reported in Tables 1 and 2 are not representative of those generally employed in formal plan valuations. Although compiled from different sources (and perhaps for different purposes, the numbers in the two tables are quite consistent. In addition, employee benefits consultants confirm that the valuation

assumptions employed in the formal (say) triennial reviews required by the Pension Commission of Ontario are typically those adopted by employers' and employees' representatives in their formal negotiations over wages and fringe benefits.

2. EMPLOYEE VALUATION OF PENSION CLAIMS AND REPORTED VALUATION ASSUMPTIONS

Indexing, whether performance or contractual, required that a real interest rate be used to value the annuities payable under the terms of a defined benefit plan. Differences between the interest rate assumptions reported in Tables 1 and 2 and the real interest rate indicate - in a straight-forward and mechanical fashion - the extent to which contribution rates must rise if mandatory indexing is introduced and benefit formulas remain unchanged. Since employer contributions to pension plans represent a form of employee compensation, it is reasonable to assume that the full incidence of such increased costs as they pertain to future service will fall ultimately on the employee. The extent to which employee compensation in the form of pension entitlements will increase, and thus cet. par. the extent to which compensation in other forms must fall, depends crucially on the role of the reported valuation assumptions in the context of employee compensation. This issue, which raises the possibility that employees may agree to the retrenchment of other pension benefits if indexing is introduced, is explored below.

Assume first that the labour market is adequately approximated by an auction model. Workers thus receive in every period compensation equal to the value of their marginal product, and value only the benefits legally due under the terms of the plan. In the absence of a legal commitment to either full or partial indexing, workers use the prevailing (pre-tax)[2] nominal rate of interest to value accruing pension benefits. By discounting nominal benefits by a nominal interest rate, workers determine the value to be accorded pension benefits in the

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2. In view of the fact that workers have access to RRSPs as an alternative vehicle through which to obtain access to the tax subsidy associated with registered pension contributions, the pre-tax nominal rate of interest should be used by rational workers to value accruing pension benefits in the context of the trade-off between current and deferred wages. If the benefit is payable with certainty, as implicitly assumed in the subsequent discussion, the risk-free nominal rate is appropriate.

context of the trade-off between current and deferred wages. The reported valuation assumptions are just a "shell" and the contribution rates so determined bear not at all on employee valuation of pension claims.

The stylized fact that ad hoc cost-of-living payments to pensions in pay are common in the non-union sector suggests, however, that the auction model may be too restrictive. Further, many analysts - including academic researchers - have used employer contributions to occupational plans to measure the value to workers of their accruing pension benefits. Yet the auction model suggests that the contribution rates established by formal plan valuations - since they are not calculated at the prevailing nominal interest rate - are not relevant to employee valuation of accruing pension benefits.

Both considerations, but especially the prevalence of ad hoc cost-of-living adjustments, suggest that an alternative model of employee valuation of pension claims may have greater empirical validity. Consider, for example, the implications of an "implicit contract" model in which employers agree to commit investment earnings above the assumed valuation rate to making ad hoc plan amendments or cost-of-living adjustments.[3] Those employers who cost their plans at low interest rates convey their commitment to employees by the high contribution rates so established. Thus the contribution rates established in formal plan valuation do reflect the value to employees of their accruing pension benefits, and the attention devoted by analysts to employer contributions per se becomes warranted.

Institutionally, the sequence of events under the "implicit contract" model is as follows. Those plan sponsors who use a low interest rate assumption will benefit from larger "experience" or actuarial surpluses, or suffer smaller "experience" or actuarial deficits. Those plan sponsors with the

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3. Workers in this "implicit contract" model presumably receive over their lifetimes compensation whose present value equals that of their marginal product. When young, workers receive compensation that is less than the value of their marginal product, and conversely when they are old. If workers are fired for malfeasance, they forego the rents that otherwise would accrue to them in later years. This restructuring of compensation payments, which is probably widespread, creates additional incentives for workers to perform at a high level in spite of the fact that employers may have difficulty in monitoring their productivity on a day-to-day basis.

most favourable actuarial experience, in turn, will be the ones most likely to grant ad hoc increases to pensions in pay. Industry observers suggest that this postulated link between actuarial experience and ad hoc cost-of-living adjustments is likely to have some merit. Indeed, this interpretation receives further support from the tendency for at least some sponsors to explicitly "fund for surplus" by adopting a low interest rate, thereby placing the sponsor in a position to make more generous ad hoc cost-of-living adjustments. There are also cases in which this variant of performance indexing is written into the by-laws of the pension plan. Consider, for example, the amended by-law to the Toronto Transit Commission's Pension Fund Society:

> Effective January 1, 1979, the pension payable to Associate Members may be adjusted annually by a percentage, such percentage to be equal to the excess of the rate of interest earned by the fixed income portion of the Fund over the valuation interest rate used by the Actuary in respect of the Associate Members, as computed by the Actuary and approved by the Society.

The auction of "shell" model suggests, by contrast, that only benefits per se are factored into employee compensation. If two firms offer the same current wage and the same benefit formula (say, 2% of each year's earnings), then employees will attach equal value to accruing pension benefits and thus to the total compensation packages. The fact that one employer may value his plan at a lower interest rate, thus requiring higher employer contributions, is ignored by actual and prospective employees. In the absence of formal indexing provisions, employees thus value their accruing pension benefits at the market (and hence nominal) interest rate, not at the reported valuation rates. Plan sponsors choose either a high or a low interest rate to value their plans on the basis of unrelated considerations, such as current or projected cash flows, and neither the employer/sponsor not employees attach weight to these assumptions in the context of employee compensation. If the plan sponsor chooses a valuation rate which is less than the market rate, the attendant actuarial gains will accrue to his benefit, not to the benefit of the employees. This result is the exact opposite of that indicated by the "implicit contract" model.

The implications of these two models of the employee valuation of pension claims can be summarized succinctly. Under the "implicit contract" model, the difference between the reported valuation assumption and the real interest rate will determine not only the required increase in the contribution rate if indexing is introduced, but also the value of this improvement to the employee. Under the "shell model", this same calculation

will - in a purely mechanical sense - continue to determine the required increase in the contribution rate. The value of this improvement to the employee, however, will be larger since the change is now from a purely nominal to an indexed benefit. The value of this improvement to the employee, however, will be larger since the change is now from a purely nominal to an indexed benefit. The value of this improvement to the employee will thus reflect the (larger) difference between the current market or nominal rate and the real interest rate. Since this incidence of the cost of indexing (or any other improvement in the non-wage portion of employee compensation) should ultimately fall on the employee if labour markets are competitive, the required concession in current wages - or perhaps other benefit retrenchment - is greater under the "shell" model.

Available data do not permit a formal investigation of the link between cost-of-living increases and reported valuation assumptions, and thus it is not possible to test directly the key prediction of the "implicit contract" model. In fact, neither the auction nor the contrct model is likely to have universal validity. In view of the fact that the majority of plan sponsors do make ad hoc cost-of-living payments to pensions in force, the auction model is clearly likely to overstate - on average - the increase in the value to employees of moving from a formally nominal to a contractually indexed benefit. At the same time, many - especially small - employers do not make ad hoc payments and for them the prediction of the auction model may prove accurate. Both models are cited in the subsequent discussion.

3. THE IMPACT OF MANDATING PRE- AND POST-RETIREMENT INDEXING ON CONTRIBUTION RATES AND UNFUNDED LIABILITIES

If a performance indexing scheme were introduced which required that investment earnings in excess of 3% be applied to escalating pensions in pay, then a rational plan sponsor would employ an interest rate assumption of at most 3% to cost the retirement annuities payable under the terms of the plan. If indexing were to apply to future service only, then the replacement of the interest rate assumption currently used to value these annuities by the 3% figure would accurately reflect the necessary increase in contribution rates, given the benefit formula. If a contractual indexing scheme were introduced, accompanied (say) by the sale by the federal government of price-indexed annuities at a real interest rate of 3%, an analogous result would obtain. If either indexing scheme were extended to past service credits, then an unfunded liability would be created. This unfunded liability, in turn, would reflect the difference between the prior interest rate assumption and the 3% rate embodied in each of the indexing schemes. The purpose of

this section of the study is to analyze the cost implications of these and related initiatives for simplified defined benefit plans.

The reported exercises (Table 3) illustrate the impact of various indexing initiatives on contribution rates for a flat benefit, a career average and a final earnings plan for both accrued benefit and projected benefit funding.[4] The benefit in the career average plans is 2% of each year's earnings; in the final earnings plan, 2% of earnings in the final year of employment times the number of years of service; in the flat benefit plan, a fixed amount equal to 2% of earnings in the first year of employment (projected benefit funding) or 2% of the earnings of a representative member at age 40 (accrued benefit funding), both times the number of years of service. Plan members are assumed to remain with certainty in the plan until age 65 and to draw their pensions for exactly 15 years. The issues of termination and vesting, as well as the more complex benefit structures of actual plans, are thus ignored.

Two distinct exercises are conducted. If indexing is to apply only to benefits in force, than this post-retirement indexing requires - in the examples at hand - that the annuities payable under the respective plans be valued at a real interest rate. If the initiative is designed to preserve the real value of benefits as they accumulate, then this pre- and post-retirement indexing to the price level requires a more complicated calculation. Because the benefit is tied to the earnings in the very last year of employment in the final earnings plan, and since - by construction - the inflation factor is the same in both the interest rate and salary scale assumptions, this benefit is effectively indexed during the pre-retirement period. This well-known feature of a final earnings plan results, in the exercise at hand, in no additional cost if the indexing requirement is extended to the pre-retirement period. In the flat benefit and career average plans, where - in the absence of plan amendment - inflation erodes the real value of pension claims even as they accumulate, the extended indexing requirement does impose additional costs. In the case of accrued benefit funding, for example, this extension would require that the relevant real interest rate be used to discount the accrued benefit in both the pre- and post-retirement periods.

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4. Under accrued benefit funding, the normal cost (and hence contribution) is the value of the benefit earned in the current year of service. Under projected benefit funding, the normal cost is the level dollar amount or level percentage of pay over the work life of the employee necessary to meet the actuarial cost of the indicated benefit.

To highlight the differences between plans in the increase in contribution rates necessitated by both variants of the indexing initiative, it is useful to examine - for each formula - the full range of possible adjustments under the "implicit contract" model. This is accomplished, using the data reported in Table 2, by examining the change in contribution rates for those plans using the highest and the lowest interest rate assumption. The salary scale was then chosen by imposing a constant interest rate - salary scale spread of 1.1% for all plans, a procedure which appears to be reasonable based on the observed data. Interest rates of 2% and 3% were chosen, for illustrative purposes, as the hypothetical real rates embodied in either of the indexing schemes.

The results (Table 3), while only suggestive of the impact on the more complicated plans that actually exist, highlight the likely magnitude of required increases in contribution rates. Consider, for example, the impact of imposing post-retirement indexing (only) in the form of requiring that "excess" earnings above 3% be applied to escalating benefits in force. Under projected benefit funding, the contribution rate would rise from 5.89% of covered earnings to 7.90% for career average plans initially valued at an interest rate of 4.2%. The economic interpretation of this result in the context of the "implicit contract" model is as follows. Assume that the real rate is 3% and that the nominal rate is 7.5%, so that the expected rate of inflation is 4.5%. Then the plan that is valued at 7.5%, so that the expected rate of inflation is 4.5%. Then the plan that is valued at 7.5% is premised on the real erosion of accrued benefits at 4.5% per year during the pre-retirement period, compared to 4.2 - 3.0 = 1.2% for the plan valued at 4.2%. The plan valued at the lower rate, in effect, contains an implicit commitment to escalate the value of accrued benefits at 3.3% per year, which necessitates the higher contribution rates. An analogous result holds if the nominal rate exceeds 7.5%, in which case the real erosion of accrued benefits is still limited to 4.5% and 1.2%, respectively, in the plans valued at the high and the low interest rate. If both pre- and post-retirement indexing are required, using the 3% benchmark rate, then the required contribution rate rises to 14.47% of earnings for both plans. This result, which reflects the facts that (1) the benefit formulas are the same and (2) the benefits are now fully indexed, indicates - of course - a much sharper increase for the plan which was originally valued at the higher rate. The very sharp increases in required contribution rates for flat benefit plans under pre- and post-retirement indexing merits note. In fact, flat benefit plans are typically amended at each contract renewal. Improvements in the benefit formula are usually applied to past service, reflecting an on-going intergenerational transfer scheme among workers. From this perspective, the sharply higher figures reported in Table 3 indicate the impact of

requiring that plan sponsors cost the benefits in real terms on a continuing basis, rather than periodically revising the benefit formula and thus establishing new unfunded liabilities. Finally, the contribution rates for both pre- and post-retirement indexing are greater for the final earnings than for the career average plans, which in turn - exceed the rates for the flat benefit plans. This result simply mirrors the assumed increase in real wages in the calculations, together with the respective benefit formulas.

Regardless of whether or not all employees correctly perceived the implications of the assumptions under which their pension benefits were being valued, these figures highlight the fact that the legislation of (say) performance indexing will substantially increase pension costs and/or lead to a retrenchment in benefit formulas. The trend towards the enrichment of benefit formulas continued during the 1970's, in spite of the continued high inflation. During the period 1970 to 1978, for example, membership in final earnings of career average plans in which the benefit equal or exceeded 2.0% per year of service rose from 65.4% to 75.4% at the total (Statistics Canada, 1980). As noted, cet. par., the impact of such benefit enrichment on contribution rates would be reduced to the extent that valuation assumptions mirrored the upward trend in nominal interest rates. Using the formulas employed to construct Table 3, it is straightforward to calculate the reduction in the benefit formula which will hold the required contribution rate constant. If only post-retirement indexing at a real rate of 3% is required, for example, the benefit would have to be reduced from 2.0% to 1.49% per year of service in both the final average and career average plans which were originally valued at an interest rate of 7.5%.

If indexing is to be applied to past credits as well, then plan sponsors would face an increase in unfunded liabilities pertaining to this service. The simplest example is to consider a plan that is fully funded at its initial valuation rate, but must now cost the annuities already due under the terms of the plan at the real interest rate. Suppose, for example, that the plan is fully funded - at the initial valuation rate - with respect to a member who is about to retire at age 65. (If the valuation rate is beneath the market or nominal rate, it is assumed that there exists an implicit commitment by the plan sponsor to provide ad hoc cost-of-living increases proportional to the excess of investment earnings above this valuation rate.) Assuming that the plan member will draw his pension for exactly 15 years, the unfunded liability is simply the difference between the capital sum required to purchase this fixed-dollar annuity at the real rather than the valuation rate. If the real rate is 3% and the valuation rate is 4%, then for each $1,000 of pension benefit this capital sum rises from $11,118 to $11,938, creating

an unfunded liability of $820. Correspondingly, the unfunded liabilities corresponding to initial valuation rates of 5%, 6%, 7%, and 8% are - for each $1,000 of pension benfit - $1,158, $2,220, $2,830 and $3,379.

Finally, a comment is in order regarding the simplified or "stylized" plans used in Table 3 to identify the implications for contribution rates of requiring either post-retirement or pre- and post-retirement indexing. The alternative is to perform computer-based simulations of the more detailed plans which actually exist, an exercise which would also entail a much more detailed set of economic assumptions such as labour turnover, mortality and so forth. Since this latter exercise is not feasible at the present time, it is important to ask whether or not the results presented for the stylized plans are indeed likely to be representative of the more detailed plans. Two points merit note. First, because of the absence of decremental factors such as labour turnover, the contribution rates identified in Table 3 clearly overstate the contribution rates that would be required to discharge the simplified benefit formulas. The increase in the contribution rates associated with a given change in the valuation interest rate will be overstated on this account. Second, a comparison of the sensitivity of the stylized plans to changes in the interest and/or salary scale assumption with the sensitivity analysis conducted by the Task Force on Retirement Incomes Policy indicates that the impact on the contribution rates of changes in the interest rate and/or salary scale (especially) assumptions is greater in the stylized plans.[5] For a given range in interest rate assumptions, the

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5. Using an initial interest rate assumption of 6.5% and a salary scale assumption of 5%, the results reported by the Task Force indicate that cet. par. a decline of 1% in the interest rate assumption will raise required contribution rates by 14% for the flat benefit plan, 14% for the career average plan, 17% for the final earnings plan with a basic credit of 2% of final salary for each year of service, at 14% for the final earnings plan with a basic credit of 1½% of salary for each year of service. For the "stylized" final earnings plan analyzed in Table 3, this same decline in the interest rate will raise the required contribution rate by 25%. Although the actuarial valuation techniques employed to produce these estimates are not strictly comparable, the greater interest sensitivity in the "stylized" plan is apparent. Interestingly, in his well-known text, Dan McGill (Fundamentals of Private Pensions, Homewood, Illinois, Richard D. Irwin, Inc. 1979) cites a "rule of thumb" that a 1% reduction in the interest rate assumption will reduce estimated pension costs by about 25%.

results reported in Table 3 may thus overstate the corresponding range in required contribution rates. In spite of this caveat, however, the results summarized in Table 3 undoubtedly reflect in qualitative terms the nature of the impact on plan costs of mandating post-retirement or pre- and post-retirement indexing.

4. THE INCIDENCE AND REDISTRIBUTIVE ASPECTS OF ALTERNATIVE INDEXING INITIATIVES

The mechanics, in terms of increased contribution rates, if either contractual or performance indexing were required with respect to future service credits (only) has been summarized in Table 3 and the attendant discussion. If such indexing were also extended to past service credits, so as to produce an immediate impact on the cost-of-living protection provided retirees or those approaching retirement, then a corresponding increase in unfunded liabilities would be created.

The fact that the income redistributive effects of potential initiatives are potentially controversial is easy to establish. There are those who argue that the deferred wage component represented by pension claims is implicitly defined in real terms and thus - at a minimum - today's pensioners are entitled to the excess or inflation-augmented investment earnings in the form of continuing, ad hoc cost-of-living increases to pensions in force. Some of these observers have gone so far as to state that pensioners are being "robbed" in the absence of such adjustments. Spokesmen for the business community, however, have emphasized that pension funds are operated by shareholders on behalf of pensioners in order to better secure pension benefits in the event of firm insolvency. Pension entitlements are defined in nominal terms, they note, and shareholders - not the pensioners - "own" the plan's assets in the sense that they stand to gain if investment performance is favourable and to lose if it is unfavourable. Excess earnings, in short, belong to the shareholder. Today's pensioners, on the basis of their past service, are not justifiably entitled to the cost-of-living adjustments advocated by the proponents of the first position.

Which of these conflicting views is valid? To start, it must be recognized that both sets of remarks pertain to current pensioners and thus implicitly refer to possible adjustments linked to prior service credit. The question of who "owns" the excess earnings related to the funds established to discharge these obligations is grounded ultimately in the valuation of accruing pension benefits during the active work years of the now retired employees. This result, together with the continued necessity of distinguishing between past and future service credits, is addressed below.

Assume, as in the auction model, that workers sell their labour services in competitive labour markets and thus can never be paid less than the value of their marginal product. Analogously, employers need pay no greater amount, so that a worker's (anticipated) compensation in every period is exactly equal to the vale of his marginal product. Consider now the implication of mandating either contractual or performance indexing with regard to future service only. The implication of the above assumptions is that the full incidence of the increase in required costs will fall on the employee, who must either (1) accept a higher fraction of his total compensation in the form of deferred wages or (2) accept offsetting reductions in other aspects of the pension benefit formula. The Task Force on Retirement Income Policies, for example, recognizes the possibility that the move toward indexing may be accompanied by a reduction in the initial level of the pension itself, although a careful assessment of this cost issue is not developed. The extent to which employees must accept either (1) or (2) is linked - in the "implicit contract" model - to the reported valuation assumptions. To the extent that this model is valid, the difference between the reported interest rate assumptions and the real interest rate embodied in the indexing initiative will be the key determinant - given the benefit formula - of the required increases in contribution rates. If the reported valuation assumptions are just a "shell", then the (larger) difference between the market rate and the real rate will be the key determinant of the (larger) increases in contribution rates.

Under both the "implicit contract" and "shell" models, but especially for the latter, the introduction of indexing may well lead employees to choose to retrench on other features of the benefit formula. Quite simply, the fraction of their total compensation that employees are willing to devote to deferred wages may not be sufficient to "buy" indexed pensions at the present level of basic benefits. It is therefore not appropriate to introduce indexing while simultaneously seeking to "protect" employees by outlawing such retrenchments. As emphasized, the incidence of any increase in pension costs related to current or future service falls entirely upon employees in competitive labour markets. Employers often discuss the cost implication of pension reform as if the full incidence fell on the employer/shareholder, while economic analysis would tend to suggest otherwise. Legal impediments to retrenchment in benefit formulas, the unlikelihood (one suspects) of employees actually taking a cut in nominal wages and other factors may initially prevent the full incidence of increased costs from falling on the employee. If competitive labour markets ensure that employees receive only the value of their marginal product, then the ultimate incidence of increased pension costs must fall on them.

Extending indexing to past service credits will, in fact, have unambiguous redistributive effects. Under both the "implicit contract" and "shell" models, the introduction of retroactive indexing would cause a windfall transfer from employers/shareholders to any employee (including pensioners or those about to retire) who has past service credit under the terms of the plan. The larger is the average interest rate assumption over the period in which the pension benefit accrued, the larger will be this windfall gain according to the "implicit contract" model. Under the "shell" model, where the benefit is purely nominal, the difference between the current market rate and the real rate embodied in the indexing initiative will determine the size of the windfall gain. The key to this result is the fact that in competitive labour markets employees can never be paid less than the value of their marginal product.[6] Thus today's active workers cannot be forced to accept a reduction in their compensation in order to "free up funds" for the employer to make indexing payments with respect to the past service of potentially quite large, provides a strong case for not requiring that indexing provisions be made retroactive. Unfortunately, if this is not done, little relief relative to that provided by the procedures employed currently will be provided pensioners and those about to retire under the terms of employer-sponsored plans.

Note, finally, the perspective provided by this discussion on the debate concerning the proprietory rights to the excess or inflation-augmented earnings of the investment fund. Under the "implicit contract" model, they are to be shared between the employer and the employee. The larger the average interest rate assumption over the period in which the employee's benefits accrued, the smaller is the fraction that belongs to him. Under the "shell" model, all such earnings belong to the employer/shareholder as the employee presumably received a current wage offset that reflected only the nominal value of the benefits provided under the terms of the plan. The employee, in addition, implicitly accepts the inflation risks attendant in the limitation of the employer's liability to a nominal pension benefit.

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6. This windfall gain could be reduced, in the "implicit contract" model, if employers sought to recapture the rents that would otherwise accrue to elder workers by paying them only the value of their marginal product. See footnote 3.

5. EMPLOYEE VALUATION OF PENSION CLAIMS: RELATED ISSUES

The Security of Benefits in "Underfunded" Flat Benefit Plans

As noted by the Task Force on Retirement Income Policy, the existence of large unfunded liabilities is confined largely to flat benefit plans. These plans provide a nominal benefit which is typically improved - and extended to past service credits - each time the union contract is renegotiated. The resulting amendments, typically designed to at least offset the impact of inflation which occurred since the prior contract was signed, are unfunded and may be amortized by special payments over a period of usually 15 years. The succession of plan amendments virtually guarantees that the plan will have large unfunded liabilities, especially in an inflationary climate. The question of the security of benefits in such plans, given the possibility of firm insolvency or plant shutdown, inevitably arises.

In Canada, as in the United States prior to the passage of the Employee Retirement Income Security Act (ERISA) of 1974, there is no plan termination insurance. Further, most employer-sponsored plans contain explicit provisions permitting the sponsor to terminate the plan, with the employer's obligation equal to the lesser of the vested benefits or the assets in the plan. Many observers[7] have argued, these legal provisions notwithstanding, that the implicit liability of the firm - so long as it is an on-going concern - is to honour all vested pension claims. Even if this were the case, however, the possibility of firm insolvency would still link the existence of unfunded vested benefits to the real possibility that members of flat benefit plans may ultimately forfeit some fraction of their vested benefits.

The question of whether these large unfunded liabilities ought to be a concern to policy-makers is again linked ultimately to the employee valuation of pension claims. Loosely, the argument is as follows.[8] If workers or their representatives appropriately "discount" contractual pension claims in less well-funded plans (i.e., accepting a smaller reduction in current

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7. Jack Treynor, "The Prinicples of Corporate Pension Finance". Journal of Finance, 32: No. (May 1977): 627-638.

8. For a formalization of this argument, in the context of the optimal degree of pension funding from the viewpoint of the employer/shareholders, see Economics 3 (June 1976), pp. 183-193.

wages, given the improvements to the pension plan, than would be the case in better funded plans), then - from the viewpoint of ensuring that workers receive the value of their marginal product - there is no legitimate source of concern for policy-makers. (To the extent that paternalistic policy-makers are concerned with the workers' retirement incomes per se, this concern may be resurrected.) If, on the other hand, workers or their representatives treat contractual claims in less well-funded plans as if they were payable with certainty in making appropriate wage concessions, then the potential concern of policy-makers is clear. In this case, however, the real issue is the inappropriate or non-rational assessment by workers of the value of their pension claims in the context of compensation "tradeoffs", not the existence of unfunded liabilities per se. Preliminary research on the state and local plans in the United States (which are not covered by ERISA) by Robert Inman of the University of Pennsylvania, as reported to the present author, provides mixed evidence on this issue. There is evidence, however, that at least some employee groups focus on the degree of plan funding per se in their negotiations, suggesting that discounting of claims does not occur in less well-funded plans. Again, this is an area of research - especially in Canada - which merits greater attention.

If plan sponsors and their employees were required to use a real interest rate to value all benefits, both pre- and post-retirement, then the degree of funding in flat benefit plans would dramatically improve. In effect, plans would be required to pre-fund the retroactive cost-of-living adjustments that typically occur with each round of collective bargaining. To the extent that retroactive plan amendments are designed primarily to offset the impact of inflation, the periodic creation of unfunded liabilities as the byproduct of these amendments would largely disappear. Although this result may appear attractive to many policy-makers, especially in the context of indexing reform in general, a number of caveats are in order. Under the present system, each plan amendment carries with it a well-defined inter-generational wealth transfer. The retroactive increases in plan benefits transfer wealth from young to older workers as part of an on-going "private social security system". The young workers accept this transfer in the expectation of receiving a corresponding transfer when they are old. To impose a different valuation and (thus) funding scheme would likely disrupt this on-going scheme, again creating windfall redistributive effects. More generally, if present contracts with their frequent amendments provide union members with an efficient means of creating intergenerational wealth transfers, the appropriateness of interfering with this system is open to question. The issue, as noted in the introduction to this report, is the extent to which the paternalistic motivation for pension reform may

conflict with the efficient contracts entered into by employers and their employees under the discipline of the marketplace.

Finally, the discussion of the extent to which employees do or do not discount vested benefits which are unfunded relates to another topical concern. There is much concern with the size of unfunded pension liabilities and the implications for aggregate share valuation. If a purely legalistic interpretation of the obligation of the plan sponsor is undertaken, and if it is remembered that the plan sponsor can terminate the plan and discharge his obligation at the lesser of funded or vested benefits, then unfunded liabilities do not represent a claim on shareholder wealth. If true, this implies that cet. par. there should be no correlation between the aggregate value of a firm's share and the size of any unfunded liability in the pension plan. This situation has its analogue in the correct discounting by the plan's members of benefits in light of their funded status, as noted previously. If there is an implicit commitment to plan continuation, such that an ongoing firm stands prepared to honour vested benefits regardless of the funded status of the plan, then unfunded (vested) liabilities are indeed true liabilities of the firm and thus cet. par. should exert a depressing impact on the aggregate value of the firm's share. To date, no careful assessment of this issue in Canada has taken place.

Inflation and Benefit Design in Employer-Sponsored Pension Plans

Throughout the 1970's, there has been a continued trend toward higher benefits (pension credit per year of service) as well as toward an improved earnings base. In 1965, for example, 65.4% of members of career average and final earnings plans were entitled to a basic credit of 2% of the relevant earnings base for each year of service. By 1978, this figure had risen to 75.4%.[9] Further, the percentage of members in final earnings plans rose from 50.9% to 58.7% of the total, while membership in career average plans declined from 24.1% to 14.3%. (Nonetheless, final earnings plans remained concentrated in the public sector: 95.8% of plan members in the public sector were in final earnings plans in 1978, compared to 29.8% of plan members in the private sector.) Similarly, crude calculations performed on these Statistics Canada data indicate that the mean benefit rate (monthly pension for each year of credited service) in flat benefit plans rose from $4.28 in 1970 to $10.56 in 1978, for a gain of 147%. This increase exceeds the 80.2% rise in the consumer price index which occurred in the same period.

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9. These and subsequent data are drawn from Statistics Canada, Pension Plans in Canada 1978.

On balance, there is reason to believe that the secular rise in the interest rate assumptions used to value plan benefits (Table 1) facilitated the apparent enrichment of benefit formulas. If plan sponsors and their employees had been encouraged to use a real interest rate, it is probable that at least some of these enrichments might not have taken place. The mandating of improved cost-of-living protection, whether through contractual or performance indexing, may prove palatable only if certain of these prior improvements can be "undone". This rather awkward state of affairs draws attention again to the importance of the informed and well-disseminated valuation of pension benefits in the context of employee compensation.

6. SUMMARY

1. Most occupational pension plans are being costed on the basis of valuation assumptions which exceed the real rate of interest. The implication is that the contribution rates so established can be realized only if the real value of pension benefits is eroded by inflation which occurs during the employee's retirement and - in most cases - in his active work years as well.

2. If mandatory indexing - whether contractual or performance - were introduced, each sponsor would value the benefits payable under the terms of his plan on the basis of the real interest rate embodied in the indexing initiative. The difference between the reported valuation assumption and the real interest rate would determine, given the benefit formula, the required increase in the contribution rate. The large variation in reported interest rate assumptions suggests there would be substantial variation across plans in these required increases.

3. To the extent that the accruing value of pension benefits is increased by an indexing initiative, offsets will be required elsewhere in the worker's compensation package. Under the "implicit contract" model, the required increase in the contribution rate noted in (2) above would also measure the increase in the value to the worker of his accruing pension benefit. Under the "shell model", in which workers value only the nominal benefit legally due under the terms of the pension formula, the increase in the value of accruing pension benefits would be greater, as would the required offset. This increase would reflect the difference between the prevailing nominal interest rate and the real interest rate in costing the benefit formula. This increase in value exceeds that under the contract model since reported valuation assumptions are universally less than the prevailing nominal rate of interest.

4. The required increases in contribution rates when post-retirement or pre- and post-retirement price indexing is introduced are illustrated for simplified final earnings, career average and flat benefit plans. The increases are calculated by replacing reported valuation assumptions by hypothetical real interest rates of 2% and 3%. The increases are particularly large for flat benefit and career average plans when pre- and post-retirement indexing is introduced, as the erosion of the real value of accruing benefits which would occur in the absence or periodic plan amendments is halted. As discussed in (3), the increase in value to workers of accruing pension benefits should at least equal the calculated increases in these contribution rates.

5. If mandatory indexing is applied only to future service, the results cited in (2) and (3) will hold. If mandatory indexing is applied to past service, then large unfunded liabilities will be created. Income will be arbitrarily redistributed from employers/shareholders to those workers who have past service credits under the terms of the plan.

6. Because of periodic and retroactive amendments, flat benefit plans in the unionized, private sector typically have large unfunded liabilities. It is not clear whether the members of such plans "discount" the promised benefits for the possibility that they might not be paid when these workers trade off current wages for improvements in the benefit formula. The use of a real interest rate to value accruing benefits would, in effect, prefund the nominal benefit improvements that typically occur. As a result, the degree of funding in such plans would increase substantially.

7. There is reason to believe that the gradual increase during the 1970's in the interest rates used to value plans, by cet. par. reducing projected costs, encouraged plan sponsors to enrich basic benefit formulas. The awkward fact is that partial retrenchment of these benefits may be required if indexing is introduced.

7. POLICY RECOMMENDATIONS

Neither the auction nor the (illustrative) contract model is likely to have universal validity. As a result, there exists ambiguously regarding employee valuation of pension claims, and thus in the offsets required elsewhere in the compensation package, if an indexing initiative is introduced. In spite of this caveat, certain policy recommendations do follow from the preceding analysis.

1. If mandatory indexing of post-retirement benefits is introduced, then workers must either (i) allocate a larger fraction of their lifetime earnings to pension benefits and/or (ii) accept a "scaling down" of present benefit formulas. The possibility of (ii), and perhaps actuarial guidelines to facilitate it, should be acknowledged by those advocating pension reform.

2. To the extent that the "implicit contract" model is valid, and hence that employer contributions per se indicate the value to employees of accruing pension benefits, the sharp differences in reported valuation assumptions (and hence contribution rates) merit note. In the context of (1) above, the necessary "scaling down" in pension benefit formulas to (say) maintain contribution rates at their present levels will vary sharply across firms. This problem, too, should be acknowledged by those advocating reform.

3. Mandatory indexing of post-retirement benefits, if introduced, should apply only to future service. To extend mandatory indexing to past service credits would arbitrarily redistribute wealth from employers/shareholders to employees who have past service under the terms of the plan.[10] Policy-makers might encourage plan sponsors to offset an actuarially based "scaling down" of past service credits in return for a retroactive extension of the indexing initiative. Employees

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10. The analysis in the text is premised on the rational behaviour of both employers and employees in competitive labour markets. If non-rational behaviour (say) on the part of employees were entertained as a possibility, then certain of the preceding conclusions could be overturned. Suppose, for example, that in spite of the absence of formal indexing pensions, employees -- but not their employers -- valued pension benefits as if they were defined in real terms. The implication is that employees value their benefits as if they were capitalized with a real interest rate. Employers, for their part, are presumed to make no such error. Thus a gap exists between the benefits as legally due (and costed by the employer) and the benefits as valued by the employee. Under these circumstances, two prior conclusions would be reversed. First, the incidence of the increased costs associated with indexing future service credits would fall on the employer, as employees would now receive the full value of their marginal product. Second, extending indexing to past service credits would simply "undo" the unintended transfer of wealth from employees to employers that had occurred in previous periods.

could then choose whether or not to extend indexing to their prior service under the revised terms of the plan.

4. Because of the prevalence of both ad hoc amendments to career average plans and negotiated, retroactive amendments to flat benefit plans, the erosion of the real value of pension benefits as they accrue during the employee's active work years is not so major a problem as might at first appear. Nonetheless, if (price) indexing is also extended to the pre-retirement period, so as to preserve contractually the real value of accruing benefits, required contribution rates for flat benefit and career average plans could rise dramatically. Again, the possibility of retrenchment in other pension benefits, together with the windfall gains created if the initiative is extended to past service credits, should be acknowledged by those advocating reform.

5. Requiring sponsors - and thus the employees - of flat benefit plans (in particular) to value accruing benefits on the basis of a real interest rate, regardless of its other merits, would be an effective means of enhancing the security of the benefits payable under the terms of such plans. This initiative could pre-empt the need for the introduction of plan termination insurance, which is being discussed in response to recent - or threatened - plan shutdowns.

TABLE 1

THE INTEREST RATE ASSUMPTION: PLANS SUPERVISED BY THE PENSION COMMISSION OF ONTARIO

Year of Survey	Plans in Sample	INTEREST RATE (%) Number of Plans								YIELD ON LONG-TERM CANADA BONDS (%)
		less than 4	4-4½	5-5½	6-6½	7-7½	8 or above	Mean	Standard Deviation	Mean
1969	84	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	4.34	N.A.	6.10
1972	128	1	60	72	5	0	0	4.81	0.51	7.50
1975	128	0	37	70	21	0	0	5.10	0.52	7.88
1978	150	0	26	73	41	9	1	5.45	0.78	8.97

NOTES: 1. Data refer to latest (triennial) actuarial report approved by the Commission for self-administered (trusteed or insured deposit administration/segregated fund) plans with 1,000 or more active members.

2. Yield on long-term Canada bonds is the average interest rate during the three years prior to the survey data on Government of Canada bonds with ten or more years to maturity.

TABLE 2

THE INTEREST RATE ASSUMPTION: PLANS SURVEYED BY FIANCIAL EXECUTIVES INSTITUTE CANADA, FALL 1979

Benefit Formula	No. of Plans	INTEREST RATE (%): NUMBER OF PLANS										Mean
		less than 3	3.0-3.9	4.0-4.4	4.5-4.9	5.0-5.4	5.5-5.9	6.0-6.4	6.5-6.9	7.0-7.4	7 or above	
Final Earnings	117	1	1	8	19	18	37	12	12	8	1	5.59
Career Average	38	0	0	4	3	10	16	1	3	0	1	5.51
Flat Benefit	27	0	1	3	7	7	6	1	1	0	0	5.10

SOURCE: Report on Survey of Pension Plans in Canada (Toronto: Financial Executives Institute Canada, March 1980). Appendix J.

TABLE 3

INTERFIRM VARIATION IN VALUATION ASSUMPTIONS: IMPACT ON ESTIMATED COSTS OF PRE- AND POST-RETIREMENT INDEXING

		CONTRIBUTION RATE (% COVERED EARNINGS)				
		Not Indexed	Indexed: Real Interest Rate (i)			
			Post-Retirement (only)		Pre- and Post-Retirement	
Projected Benefit Funding (Entry Age 30)			i=2.0	i=3.0	i=2.0	i=3.0
Career Average	r=7.5, g=6.4	5.89	8.48	7.90	18.24	14.47
	r=4.2, g=3.1	11.14	12.97	12.09	18.24	14.47
Final Earnings	r=7.5, g=6.4	14.76	21.23	19.80	21.23	19.80
	r=3.0, g=1.9	19.80	21.23	19.80	21.23	19.80
Flat Benefit	r=6.7, g=5.6	2.18	2.99	2.78	15.50	10.18
	r=3.5, g=2.4	8.26	9.17	8.55	15.50	10.18
Accrued Benefit Funding (Age 40)						
Career Avearge	r=7.5 --	2.55	3.67	3.44	15.72	11.41
	r=4.2 --	7.79	9.07	8.46	15.72	11.41
Final Earnings	r=7.5, g=6.4	13.68	19.69	18.35	19.69	18.35
	r=3.0, g=1.9	18.35	19.69	18.35	19.69	18.35
Flat Benefit	r=6.7 --	3.54	4.85	4.19	15.72	11.41
	r=3.5 --	9.73	10.80	10.07	15.72	11.41

NOTES:

1. Range of interest rate (r) assumptions, by benefit formula, drawn from Report on Survey of Pension Plans in Canada (Toronto: Financial Executives Institute Canada, March 1980), Appendix J. Salary scale assumptions (g) determined by subtracting grand mean interest rate/salary scale "spread" of 1.1% from corresponding interest rates.

2. Benefit in career average plans is 2% of each year's earnings; in final earnings plans, 2% of earnings in final year of employment for each year of service; in flat benefit plans, a fixed amount equal to 2% of earnings in first year of employment (projected benefit funding) or 2% of earnings

TABLE 3 (CONTINUED)

of representative member at age 40 (accrued benefit funding), both times years of service. Plan members remain with certainty in plan until age 65, and draw pensions for exactly 15 years.

3. Real interest rate of 2%, combined with nominal rate of 7.5%, implies an inflation rate of 5.5%, etc. The constant interest rate/salary scale "spread" of 1.1% implies that real salary growth is 0.9% when the real interest rate is 2% and 1.9% when the real interest rate is 3%.